

What is claimed is:

1. An excitation control circuit comprising:
 - a driving circuit for driving a coil of a solenoid in response to a pulse signal
 - 5 supplied from an external device;
 - a counter-electromotive force absorbing circuit, inserted in a path of a return current of the coil, for absorbing counter-electromotive force produced by the coil; and
 - a return current circuit, connected in parallel to the counter-electromotive force absorbing circuit, for intermittently bypassing the return current.
- 10 2. An excitation control circuit as claimed in claim 1, wherein the return current circuit has a first transistor, whose current path is connected between a positive electrode and a negative electrode of the coil, wherein the first transistor is switched on according to a signal for defining the timing of bypassing the return current.
- 15 3. An excitation control circuit as claimed in claim 1, wherein the counter-electromotive force absorbing circuit includes:
 - a transistor whose current path is connected between a positive electrode and a
 - negative electrode of the coil; and
 - 20 a control system for switching on the transistor when an inter-terminal voltage of the transistor in its current path exceeds a predetermined value.
- 25 4. An excitation control circuit as claimed in claim 2, wherein the counter-electromotive force absorbing circuit includes:
 - a second transistor whose current path is connected between the positive

electrode and the negative electrode of the coil; and

a control system for switching on the second transistor when an inter-terminal voltage of the second transistor in its current path exceeds a predetermined value.

- 5 5. An excitation control circuit as claimed in claim 2, wherein the first transistor is a field effect transistor and the inter-terminal voltage of the first transistor is a voltage between a source and a drain of the field effect transistor.
6. An excitation control circuit as claimed in claim 3, wherein the transistor is a
10 field effect transistor and the inter-terminal voltage of the transistor is a voltage between a source and a drain of the field effect transistor.
7. An excitation control circuit as claimed in claim 4, wherein the second
transistor is a field effect transistor and the inter-terminal voltage of the second transistor
15 is a voltage between a source and a drain of the field effect transistor.